Embedded Linux Training Course

COURSE DESCRIPTION

This training course provides engineers with fast and cost effective way to acquire the skills necessary to design develop systems and applications based on embedded Linux.

COURSE FORMAT

- This is four-day instructor-led course consists of lecture and lab sessions
- Participants receives individual guidance from expert who has extensive experience with embedded Linux

PREREQUISITE SKILLS

- One year of C programming
- Basic understanding of operating systems

LOGISTICS REQUIREMENTS

- Participants need to bring their laptops for lab exercises

Course: **Embedded Linux Training**

Duration: Four Days

Format: Instructor-led lecture and hands-on labs

Content:

Day1: Getting Started, Cross Compilation Toolchains, Bootloaders

Day2: Linux Kernel Introduction, Kernel configuration, Cross Compiling Linux kernel, memory and interrupts

Day3: Linux Kernel Modules, Root Filesystem, Real Time in Linux

Day4: Device Driver Introduction, Character Driver, Block Driver

SYLLABUS

Day 1

GETTING STARTED

- Embedded Systems Overview
- Benefits of Using Linux
- Embedded Linux Overview
- Hardware Support
- Software Components
- Development Environment
- Host Target Communication

Cross Compilation Toolchains

- Overview
- Toolchain Build Types
- Toolchain Components
- Toolchain Options
- Getting a Toolchain
- Toolchain Contents
- Lab Exercise

BOOTLOADERS

- Overview
- Boot Sequence
- U-boot bootloader
- Lab Exercise

Day 2

LINUX KERNEL INTRODUCTION

- Kernel Overview
- Kernel versioning Scheme
- Kernel Source
- Kernel Patches

KERNEL CONFIGURATION

- Linux Kernel Build System
- Linux Kernel Configuration
- Kernel Options
- Lab Exercise

KERNEL CROSS COMPILATION

- Kernel compilation and Installation
- Cross compiling kernel
- Lab Exercise

MEMORY AND INTERRUPTS

- Physical and Virtual Memory
- Interrupt Management
  - ✓ Interrupt Handler
  - ✓ Softirq
  - ✓ Tasklet
  - ✓ Workqueue
  - ✓ Threaded interrupt

Day 3

LINUX KERNEL MODULES

- Kernel Module Overview
- Building Kernel Module
- Module Integration with Kernel
- Module Parameters
- Lab Exercise

LINUX ROOT FILESYSTEM

- File System Overview
- Linux Root Filesystem
- Root Filesystem Contents
- Virtual File System
- Minimal Filesystem
- Busybox
- Lab Exercise

REAL TIME IN LINUX

- Real Time Operating Systems
- Kernel Preemption
- Real Time options in Linux
- Hard Real Time in Linux

Day4

DEVICE DRIVER INTRODUCTION

- Device Driver Overview
- Device Driver Types
- Device Files
- Linux Device Model
- In-tree vs Out-of-tree Development

CHARACTER DRIVERS

- Character Drivers Overview
- File Operations
- Exchanging Data with User Space
- Device Registration
- Example Driver Code
- Lab Exercise

BLOCK DRIVERS

- Overview
- Block Device Operations
- Request Processing
- ioctl control
- Lab Exercise